

Exploring the Hard X-ray Polarization of Southern Hemisphere X-Ray Sources with a Long-Duration Balloon Flight of X-Calibur

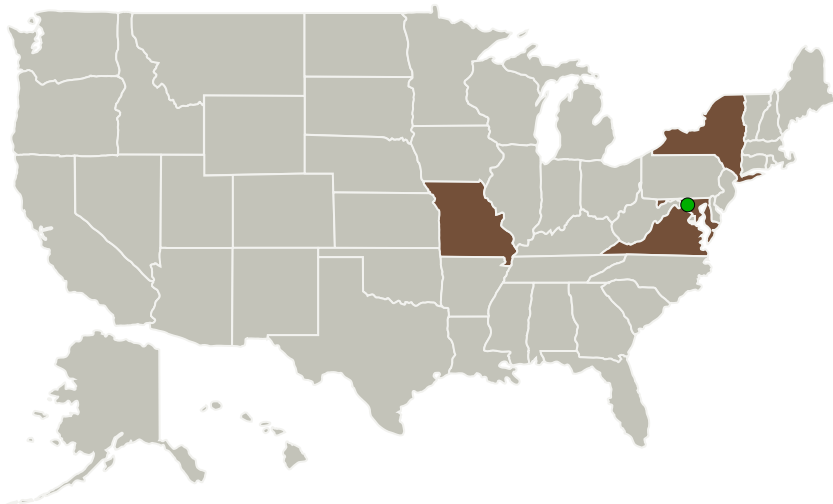
Completed Technology Project (2018 - 2020)



Project Introduction

X-Calibur is a balloon borne hard X-ray polarimetry mission combining a grazing incidence 8m focal length X-ray mirror with a hard X-ray scattering polarimeter made of a scattering element surrounded by an assembly of Cadmium Zinc Telluride (CZT) detectors. The combination of a focusing multilayer mirror with and an actively shielded polarimeter gives X-Calibur excellent sensitivity and energy resolutions over the broad energy range from 20 keV to 60 keV. After a conventional 1-day test flight from Fort Sumner, we apply here for supplementary funding for a December 2018-January 2019 Long Duration Balloon (LDB) flight. The LDB flight will be launched from McMurdo (Antarctica) and will allow us to measure the 20-60 keV X-ray polarization properties of flaring X-ray binaries, the supergiant X-ray binaries Vela X-1, GX 301-2, and 4U 1700-377, and the prototypical radio galaxy Centaurus A. The LDB flight will take advantage of an optimized polarimeter and shielding design which improves the overall signal-to-noise ratio by a factor of three compared to the original design.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Science Mission Directorate (SMD)

Responsible Program:

Astrophysics Research and Analysis

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Organizations Performing Work	Role	Type	Location
Brookhaven National Laboratory(BNL)	Supporting Organization	R&D Center	Upton, New York
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland
Washington University in St Louis	Supporting Organization	Academia	Saint Louis, Missouri

Primary U.S. Work Locations	
Maryland	Missouri
New York	Virginia

Project Management

Program Director:

Michael A Garcia

Program Manager:

Dominic J Benford

Principal Investigator:

Henric S Krawczynski

Co-Investigators:

Fabian F Kislat
Dyanna C Vitale
Manel Errando
Takashi Okajima
Banafsheh Beheshtipour
Quin Abarr
Shaorui Li
David W Stuchlik

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.2 Observatories
 - └ TX08.2.1 Mirror Systems

Target Destination

Outside the Solar System